

Asexual Propagation

- I. Propagating by cuttings
 - A. Rooting structures
 1. Cold frames covered with plastic or glass sash.
 2. Flats or boxes covered with plastic or glass.
 3. Beds with mist-constant or intermittent.
 - B. Rooting media
 1. Sand- clean, sharp, free of soil and organic matter.
 - a. Not as retentive of moisture as other materials and requires more frequent watering.
 2. Sand and peat mixture - 1 to 1 - 2 to 1 - 1 to 2 - etc.
 - a. increase water-holding capacity
 - b. danger of over-watering
 3. Vermiculite
 - a. is sterile
 - b. use medium size particles (Hort. grade)
 4. Perlite or perlite and peat mixture
 - C. Softwood cuttings
 1. Generally root easier and quicker than other types
 - a. requires more attention
 - b. handle carefully to prevent drying
 - c. rooted under condition of very high humidity
 - d. temperature - 70° to 80°
 2. Use proper type of cutting wood
 - a. mature, current season growth
 - b. cuttings 3 - 5 inches long
 - c. use average growth from portion of plants in full light, free of disease and insects
 - d. remove all flower buds
 3. Making the cuttings
 - a. early morning best time
 - b. keeps moist (in moist plastic or burlap). Keep in refrigerator if not stuck soon after making (in plastic bag).
 - c. cut stems at 45 angle 1/4" below node
 - d. remove about lower 1/3 leaves
 - e. dip basal 1/2" to 1" in rooting hormone and stick at once.
 1. large leaves may be reduced in size
 2. retain maximum leaf area (without wilting) for best rooting
 - D. Leaf bud cuttings
 1. Consists of leaf, petiole, and a short piece of stem with the axillary bud.
 2. This method is valuable when propagating material is scarce.
 3. Made only from material having well developed bud and healthy, actively growing leaves.
 4. Treat with root-promoting hormone.
 5. Insert in rooting media with bud 1/4" to 1/2" below the surface.

- E. Leaf cuttings
 - 1. Leaf blade or leaf blade and petiole are used
 - 2. Examples: Sansevieria (leaf blade pieces)
African Violet (leaf and petiole)
Rex Begonia (leaf with mid vein cut)
Peperomia (leaf and petiole)

- F. Root cuttings
 - 1. Generally taken in late winter or early spring before new growth begins.
 - 2. Make cuttings 2" to 6" long
 - 3. With vertical planting - end of cutting nearest the crown of the plant should be placed up.
 - 4. Horizontal planting - place about 2" deep.

- G. Hardwood cuttings
 - 1. Least expensive and easiest method of vegetative propagation.
 - 2. Cuttings prepared during dormant season.
 - 3. Generally 6" to 8" long.
 - 4. Cutting from healthy, vigorous plants - use wood of average size and vigor.
 - 5. Tie in bundles, placing tops the same way.
 - 6. Bury outdoors in sandy soil, sawdust or sand to callus - usually placed in a vertical position.
 - 7. Line out in rows after callusing.

- II. Layering
 - A. Root formation during layering is stimulated by various stem treatments that cause an interruption in the downward translocation of organic material - carbohydrates, auxins, and other growth factors - from the leaves to the growing tips. These materials accumulate near the point of treatment and rooting occurs in the general area.

 - B. Root formation on layers depends upon:
 - 1. continuous moisture
 - 2. good aeration
 - 3. moderate temperatures

 - C. Tip layering
 - 1. Shoot tip begins to grow downward into the ground but curves upward sharply - roots develop at the sharp bend.
 - 2. Natural method of propagation for trailing blackberries, dewberries.

 - D. Simple layering
 - 1. bend branch to ground
 - 2. cover partially with soil
 - 3. leave terminal bud exposed
 - 4. end of branch is sharply bent to upright position 6 to 12 inches from tip

- a. cut underside
- b. peg in ground to hold in place

E. Compound layering

1. same as simple layering except branch is alternately covered and exposed
2. exposed part must have at least one bud
3. plants propagated this way - Muscadine, ornamental vines such as Wisteria and Clematis, Malling apple, Oriental Magnolia

F. Mound or stool layering

1. mother plant grows one year
2. top removed 1" above soil before growth begins
3. shoots 3-5 inches high add soil $\frac{1}{2}$ their height - soil added until 6 - 8 inches high.
4. roots formed at end of season

III. Grafting and Budding

A. Reasons for grafting and budding

1. Propagate plants that cannot be reproduced by cuttings, layers, divisions or other methods.
 - a. will not root
 - b. too low % root to be economical
2. To obtain desirable root characteristics not obtained when the scion variety is on its own root system.
 - a. resistant to nematodes
 - b. resistant to disease
 - c. to obtain exceptional vigor
 - d. dwarfing
3. Obtain the benefits of certain intermediate stock.
 - a. scion and rootstock not completely compatible, a variety compatible to both is inserted between the two. Dwarf pear Bartlett on Hardy on Quince.
 - b. certain growth habits - Tree Rose
4. Change varieties of established plants (Top working)
 - a. such as changing pecan varieties
 - b. such as American Holly - graft male branch on isolated female plant to obtain better fruiting
 - c. more than one variety per plant as 5 in 1 apple
5. To hasten the growth of a desired seedling selection or variety

B. For any grafting operation to be a success there are several important factors to be considered:

1. The stock and scion must be compatible. Plants should be closely related - Camellia on Camellia seedling or C. sasanqua - Apple on Apple.
2. The cambium of the scion must be in close contact with cambium of the stock.

- a. Cambium - a thin layer of tissue between the bark (phloem) and the wood (xylem) - the cells are capable of dividing and forming new cells.
 - b. cut surfaces must be held together tightly by wrapping
 - c. rapid healing is necessary so the scion may obtain water and nutrients from the stock
 3. Grafting operation must be done at proper time of year.
 - a. grafting is done with dormant scion in late winter or very early spring (just as growth begins).
 4. Immediately after the grafting operation is finished, all cut surfaces must be thoroughly covered with grafting wax or otherwise prevented from drying out.
 5. Give proper care to grafts.
 - a. remove shoots from stock below graft
 - b. stake or tie up if needed
 - c. check and remove, if necessary, string or wrapping used to hold graft in place
- C. Grafting methods
1. whip or tongue
 2. cleft
 3. bark
 4. Done in early spring after growth of the stock begins so the bark will separate from wood.

IV. Budding

- A. Budding operation can be performed more rapidly than the simplest method of grafting
 1. Rose budders insert 2000 - 3000 t-buds a day if a helper does the tying
 2. Budding is done when the bark slips or separates from the wood - Spring (June) or fall.
 3. Bud sticks from current season's growth - vigorous with vegetative buds (watersprouts).
 - a. short, slow growing shoots could be avoided
- B. 3 to 4 days after budding, cut back top 2 to 5 inches above bud - leaving at least 1 leaf above and 2 - 3 below bud. 10 - 14 days after budding, cut back bud.